

National Health Interview Survey

Report of the
National Committee on
Vital and Health Statistics

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National Committee on
Vital and Health Statistics

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Office of Health Research, Statistics, and Technology
National Center for Health Statistics
Hyattsville, Maryland 20782

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LETTER OF TRANSMITTAL



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20201

April 3, 1980

The Honorable Patricia Roberts Harris
Secretary, Department of Health,
Education, and Welfare
Washington, D.C. 20201

Dear Secretary Harris:

On behalf of the National Committee on Vital and Health Statistics (NCVHS), I am pleased to transmit the report of the Panel on the Health Interview Survey (HIS). This is one of several areas of study consistent with the Committee's mandate under Section 306(k) of the Public Health Service Act.

This report represents an important contribution to the continuing consideration of the work of the National Center for Health Statistics (NCHS) in collecting information consistent with its legislative mandate concerning the extent and nature of illness and disability of the population of the United States; the impact of illness and disability of the population on the economy; determinants of health; environmental, social and other health hazards; and the utilization of health care.

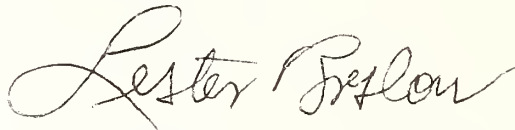
The Panel on the Health Interview Survey was established to evaluate how well the national Health Interview Survey was meeting its legislative mandate. Members of the panel were selected from many disciplines so that the technological aspects of HIS could be reviewed as well as the applicability of the results to users such as this Department, the Congress, other Federal agencies, State health departments, health planning units, and health researchers and other investigators from all segments of society.

I am pleased to inform you that the Committee strongly endorses the Panel's recommendations and the strategies suggested for strengthening this important activity. The Committee recommends thorough review and appropriate implementation of the recommendations contained in this timely report by the Department, and most particularly by NCHS. We hope that the Panel's recommendations concerning the content of the questionnaire; methodology and design features; role of the HIS in meeting subnational needs; and technical assistance and demonstration activities will continue to strengthen an already sound activity.

The Committee's recommendations have been developed in consideration of the needs of both the public and private sectors. Certain recommendations, therefore, may not be totally applicable within the sphere of Federal programs, and certain recommendations may require adaptation to assure applicability within the Federal sphere. The recipients of the report will be advised that it does not necessarily represent Departmental policy.

The NCVHS is indebted to the members of the Panel on the Health Interview Survey for their hard work, advice, and guidance as it considers the future activities of the NCHS in fulfilling its responsibility to collect "comprehensive health statistics." The Committee is especially grateful to the Chairperson, Dr. Bernard G. Greenberg for his skillful leadership. The Committee further acknowledges the efforts of the staff of the National Center for Health Statistics, in particular Mr. Robert R. Fuchsberg and Miss Gail H. Sherman.

Respectfully,

A handwritten signature in cursive script that reads "Lester Breslow". The signature is written in dark ink and is positioned above the printed name and title.

Lester Breslow, M.D., M.P.H.
Chairman

Enclosure

INTRODUCTORY NOTE

DEDICATION

The Panel, whose report is being presented in this document, was created on January 24, 1977 by the National Committee on Vital and Health Statistics to act as a Technical Consultant Panel on the Health Interview Survey. The members, appointed from outside the National Center for Health Statistics, represented a broad cross-section of data users and methodologists from research and educational institutions, governmental agencies, health planning units, and the general public.

Just after the Panel had prepared the first draft of its final report, one of its members was killed in the plane crash disaster at San Diego airport in September 1978. Although Leo Glenn Reeder was thereby prevented from helping to put the finishing touches on this final document, he had provided several written sections and had participated fully in the discussions that led to the recommendations and suggestions. The remaining members of the Technical Consultant Panel, in an effort to recognize Dr. Reeder's dedication and contribution, unanimously decided to dedicate this Report as a memorial to Leo Glenn Reeder. If the Report has beneficial effects for the many consumers of data from the Health Interview Survey, they will owe a debt of gratitude to Dr. Reeder for his insistence on the best and most efficient techniques of data collection and analysis in the Survey.

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NATIONAL HEALTH INTERVIEW SURVEY

Section I. Introduction

During 1976-77 the National Committee on Vital and Health Statistics initiated a series of actions to review the data collection procedures and basic data sets being managed by the National Center for Health Statistics. The overall review process adopted was the establishment of subcommittees consisting of several members from the National Committee on Vital and Health Statistics and supplemented by nonmembers who were specialists in the subject matter involved. Each of these subcommittees was designated a Technical Consultant Panel with the specific name or mission of the subcommittee appended.

The Technical Consultant Panel on the National Health Interview Survey, whose report is here presented, was the subcommittee named to evaluate how well the National Health Interview Survey (NHIS) was meeting its legislative mandate. The members of the Panel were selected from many disciplines so that both the technological aspects could be reviewed as well as the applicability of the results to users such as the Congress, other Federal agencies, State health departments, health planning units, and health research investigators from all segments of society. The charge to the Panel was rather specific and is described in the following sections.

The modus operandi of the Panel was to meet for 2 days every 3 or 4 months with a planned agenda and ample time for questions and discussion. Each agenda was prepared as a result of expressed opinions of the Panel members and finalized by consultation of the Panel chairman with the Director of the Division of Health Interview Statistics, who served as liaison and voting member of the Panel. The sequencing of the agenda items was so structured as to inform Panel members about the current status of the National Health Interview Survey, its history, legislative authority, sample design, current operations, problems, and plans for the future.

Considerable time was devoted to reports on how core and supplementary questions are selected, tested, and tabulated. The Panel also met with members of several other Federal agencies to learn about their

data needs. Significant effort was devoted to making more efficient and extensive the solicitation of data needs from other Federal agencies and the procedures to obtain independent judgment as to the relative importance of these requests. Additional effort was expended in studying how the inclusion of supplementary questions could be expedited in order to reduce the lag time and the difficulties encountered by those requesting such data.

Attention was also directed to hearing reports on the current users and uses of the National Health Interview Survey data. The Panel was impressed by the documentation and analysis of such listings, and this influenced the selection of supplementary questions in several instances.

A representative from the U.S. Bureau of the Census met regularly with the Panel and spent a great deal of time explaining the Current Population Survey procedures as well as current Bureau plans to redesign the sampling scheme after the 1980 census data have been analyzed. This information was used by persons from both within and without the Division of Health Interview Statistics to help study the possibilities of publishing estimates, with given reliabilities, for cities, States, and other subnational regions. Many possibilities were considered along these lines, although all such estimates were restricted to the concept that the basic data collection procedure would remain unchanged and would be based upon the personal health interview and schedule currently in use.

The Panel spent almost a whole day hearing reports on progress of the research and data collection procedures being used by the Research Triangle Institute for the National Medical Care Expenditure Survey. The experimentation being conducted with diaries and telephone interviews had bearing upon possibilities that needed to be explored further for the Health Interview Study.

In summary, the Panel devoted a large portion of its efforts to consider where the NHIS was with respect to where it should be in accordance with legisla-

tive mandate and current needs. The members of the Panel then considered how the Division of Health Interview Statistics and other research units in the National Center for Health Statistics (NCHS) could introduce changes in the NHIS in order to advance from its current position to a point where the Panel believed it should be in 1979.

It is well to point out that planning for the future directions of the Survey were not formulated without the realistic knowledge that many of the recommendations would require additional resources, personnel, and perhaps even new administrative authority. The members of the Panel, themselves researchers or administrators with research backgrounds, recognized the futility of suggesting grandiose schemes unless some effort is made to provide the wherewithal to implement them. On the other hand, not all of the recommendations involved new resources, but rather a redirection and renewed emphasis with current resources. Therefore, wherever it seemed necessary and appropriate in the recommendations, the Panel specified that there would be need for more funds, more staff positions, a greater use of the Intergovernmental Personnel Act of 1970 (IPA), contract mechanisms, and other means to enable the administrator to follow through on the proposed measures.

This report is intended as a response of the Panel, acting as a Subcommittee of the National Committee on Vital and Health Statistics, to be considered a working document primarily for internal use. Copies will be directed simultaneously to the attention of the Director of the Division of Health Interview Statistics and to the Director of the National Center for Health Statistics. If the National Committee on Vital

and Health Statistics (NCVHS) approves the report, it is most likely to be forwarded to the Deputy Assistant Secretary for Health Research, Statistics, and Technology and to the Secretary, Department of Health and Human Services.

The report was not prepared with the primary purpose of publishing a formal evaluation or a blueprint for the future. The contents of the report are neither confidential nor restricted in any way, and if the Director of the National Center for Health Statistics feels that certain portions, not taken out of context, merit publication and wider distribution, there is no objection to such printing and dissemination.

The members of the Panel were honored and privileged to be nominated for this assignment and participated with the hope that their contributions would facilitate the gathering, analysis, and application of data relevant to the health status of all Americans. The National Health Interview Survey has served this country well during the past two decades of its existence. New developments in total survey design, data collection techniques, and newer methods of processing and analyzing data, however, mean that the future will be bright only if these and other methodological improvements are studied and applied promptly.

If the next Panel that reviews progress in the 1980's is to conclude that the National Health Interview Survey did accomplish its mandate to fulfill the growing demands for comprehensive health statistics, the current Panel hopes that this report will have been instrumental in helping to achieve that goal.

Section II. Charge to the Panel

The National Committee on Vital and Health Statistics charged the Technical Consultant Panel on the National Health Interview Survey with the following:

- To recommend, in order of priority, the topics for which the type of general purpose data produced by the Survey are most needed on a national, regional, or State basis.
- To review the relevance of the core questions, which are asked on an ongoing basis, in terms of the changing emphasis or direction of the national public health policy.
- To recommend, on an annual basis, whether the core component of the questionnaire should be expanded or contracted in relation to the amount of interviewing time to be left for supplemental topics.
- To consider and make recommendations regarding any biases resulting from the sampling methods, the survey collection techniques, and the data processing and analytical procedures that may produce inaccurate or invalid estimates for any numerically significant group.
- To review and make recommendations regarding the types of sociodemographic data collected on each person with regard to both the variables to be included and the type of information to be sought on each variable.
- To make recommendations regarding the most appropriate form for disseminating the data, with special emphasis on the questions of the trade-off between the amount of time devoted to analysis and the timeliness of the release of the data.
- To make recommendations regarding the optimum sample size and the frequency with which this survey should be conducted.

Section III. Summary of Recommendations

The recommendations of the Panel are grouped into four convenient categories for easy reference: (1) content of questionnaire; (2) methodology; (3) analysis, use, and timeliness of dissemination; and (4) role of NHIS in meeting subnational needs.

CONTENT OF QUESTIONNAIRE

The relative role and contributions of core and supplementary items are defined in this report, and guidelines are provided on how to decide what should be considered a core question. Core items provide for a continuous long-term series of data and no item should enter that category unless time trends are absolutely essential. Any net increase in the core items means the shortening or elimination of supplemental items, because the current interview is considered full, and any time increase for one section requires a compensating reduction elsewhere. The supplementary questions should be responsive to the needs of Federal agencies and other entities. Routine solicitation of newly suggested items should be obtained every 2 or 3 years.

The Panel had reservations about the core items relating to chronic conditions. It did not feel that in all cases the detailed data on chronic conditions justifies the costs of collecting and tabulating them. Instead, it recommended that the list of chronic conditions, for which prevalence data are collected, be shortened to eliminate those conditions for which useful prevalence data cannot be estimated. Furthermore, the members of the Panel felt that the coding of all chronic conditions to the four-digit code of the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA) was not only a delaying factor but also an unnecessary expense, since such detail implies a level of accuracy and reliability that is not always warranted.

The Panel recommended the inclusion of some questions on mental health, occupational and environmental health, and health insurance and expenditures. The NCHS was urged to consult with other Federal agencies for specific suggestions on how their data needs might easily be met in these areas. In reviewing the requests for supplementary

items, the Panel urged NCHS to use an external group of advisors to review the requests. There were other related functions that an advisory committee or Panel might fulfill.

Regarding the sociodemographic variables included in core items, the Panel urged that attention be given to achieve some degree of uniformity so that all Federal programs, or at least NCHS, would use the same categories to collect these data. Expansion of the items to include religious preference and disaggregation of the data for those 65 years of age and over were also recommended.

METHODOLOGY

Total Survey Design

In the historical development of sampling survey methodology, the initial emphasis was on minimizing the sampling error of estimates for a given cost. More recently, new research has focused on designing surveys to minimize total error that incorporates response bias and variance with sampling error. This led to Total Survey Design (TSD), an approach whose effective application requires knowledge of data objectives as well as the error structure. The Panel believes that the NHIS has not yet made a systematic attempt to evaluate significant alternatives to the present design of the survey such as the issue of bounded interviews and partial rotation of the sample.

The Panel recommended that NCHS undertake a careful and comprehensive evaluation, based on TSD principles, to determine the feasibility and desirability of several alternatives to existing NHIS data collection and sample design features. Design changes resulting from this evaluation should be timed to coincide with the redesign of the sample following the 1980 Census of Population and Housing.

The Panel also recommended that TSD principles be followed in providing technical assistance to help State and local governments meet their health data needs. Moreover, low cost survey methods such as computer-assisted telephone interviewing with random-digit dialing be given full consideration as alternatives to replication of the procedures used in NHIS.

Strengthening the Sample

Increasing demand for wider coverage of subject matter and greater detail for analyses mean that the NHIS must be strengthened by increasing its capacity by a more efficient sample design. This will facilitate more detailed and reliable data for different demographic, socioeconomic, and geographical sectors of the population on a more timely basis. The specific change in sample design was not prescribed except to point out that the new one should be cost effective.

Continuing Versus Periodic Surveys

The question was raised whether NHIS should be a continuous survey or a periodic one every n years. Considering all the elements involved, including interviewer training and bias, the Panel felt that continuation of a continuous survey was preferable in the absence of a drastic change in the survey budget.

Redesign of NHIS in the 1980's

The sample design for NHIS is closely linked to that of the Current Population Survey (CPS) and other sample surveys of the U.S. Bureau of the Census. Inasmuch as the change of the U.S. Bureau of the Census design following the 1980 census is likely to be a major one, the opportunity for a strengthened sample and TSD to be incorporated will be unique for NHIS. The NHIS should start immediately to make an intensive review of its own design features (e.g., longitudinal versus cross-sectional approach, respondent rules, length of reference period, use of diaries, interview methodology, and other features) to take advantage of the opportunities by the post 1980 Census Bureau design.

Methodological Research

Although a tremendous wealth of survey knowledge has come from NHIS, the Panel believes the opportunities for whole new approaches in data collection and analysis are not being exploited. There are new data requirements, new techniques of interviewing and data collection, new processing technologies, and whole new concepts of error structure that require research by the NHIS staff. The Panel therefore recommended that not less than 10 percent of the NHIS budget should be allocated to methodological and developmental research.

Cross Analysis With Other Data Sets

The NHIS is only one of a large number of data sets compiled by the Federal government. Analysis of the NHIS in isolation of all the others deprives the Nation of valuable linkages. Examples of typical linkages are provided in the full report and these illustrations reflect possible usefulness of cross analyses for policy issues as well as etiological issues in epidemiology. The NCHS is charged with establishing a procedure for cross analysis of the NHIS with other data sets.

ANALYSIS, USE, AND TIMELINESS OF DISSEMINATION

The value of NHIS is ultimately dependent on the extent to which it is used. There are three strategies for serving users that should be strengthened:

- More publicity should be given to the fact that NHIS can provide raw data and tabulations on data tapes to people who need such information on a reimbursable basis.
- More attention should be devoted to ways of incorporating special purpose items in the NHIS without too much delay. The current lag seems to be due to the lead time needed to develop and incorporate questions.
- The ongoing analyses are less than desirable because of lack of staff availability. In this respect, the highest priority should be given to increasing staff positions to strengthen the analytic capability. The NHIS should explore ways of offering special incentives to staff members for producing and disseminating analyses of NHIS data. Also, expanded use of the IPA mechanism should be sought to recruit talented persons to devote themselves to the analysis of NHIS data. Finally, when responding to requests for special data collections from other Federal agencies, part of the joint commitment should include staffing for the analysis of the collected data.

The NHIS should continue to study users of their data and to evaluate the usefulness of given data sets.

ROLE OF NHIS IN MEETING SUBNATIONAL NEEDS

Subnational Data Needs

In Section IV, subnational data needs are defined in a discussion of the new legislation in Public Law 95-623. This demand for subnational data has increased exponentially during the past decade because of the Federal promotion of health planning and regulation at small area levels. These changes plus the inflationary effects of increases in all health expenditures have made it essential to study the distribution of health services as well as their impact. Thus there are State and county needs as well as the needs of the Health Systems Agencies (HSA's) and Professional Standards Review Organizations (PSRO's). Other Federal legislation, such as support for Health Maintenance Organizations (HMO's) and the placement of professional personnel in the National Health Service Corps, have also added to the need for local data. The underserved and shortage areas have tremendous stakes in having such data available on a timely basis.

This report documents several illustrations whereby the use of health interview data can provide useful information at the State and local level on resources, utilization of facilities, expenditures, health manpower shortage areas, etc.

Capabilities of the Present National Sample

Each week's interviews constitute a probability sample of the Nation, but the primary focus is on estimates for the entire country based on 52 weeks. Some estimates, however, are based on 13 sample weeks, others on 104, and occasionally a single week for a high incidence phenomenon. Past practice has restricted publication of direct estimates for subnational data and, in fact, the present design is not well adapted for estimates of individual States or smaller areas. With redesign of the survey after the 1980 census, it may be possible to produce direct estimates for the eight largest metropolitan areas and eight States. Even if the sample size is quad-

rupled, however, there would be 22 States for which annual direct estimates would not be sufficiently reliable for publication, and subnational data below the State level would still be unavailable. Some modifications of current procedures could be adopted, or should be explored, to strengthen the subnational data program after 1980. One simple method would be to base subnational data on 104 weeks of interviewing and, thus, there would be biennial publications for most of the global statistics. Another possibility would be to divide sample resources into two parts. Part A would be the continuation for the present system and provide global statistics for the Nation and larger States and metropolitan areas. Part B would distribute resources differently, reduce the number of items queried and experiment with lower-cost collection techniques, such as mail and telephone. Other solutions involve greater use of synthetic and composite estimates for the subnational areas. The Panel recommended greater use of the synthetic estimate as well as the composite estimator.

Unfortunately the growing demand for subnational data will probably not be fulfilled by any of the foregoing procedures, including the strengthening of the design of the survey or by increasing the sample size within reasonable bounds.

Technical Assistance

A more suitable and practical method of meeting subnational data needs is for NCHS to provide a complete range of technical assistance and demonstration activities on health interview survey methods and the uses of such data. This program of technical assistance should take advantage of relatively low-cost data collection techniques when they can be expected to produce data with adequate reliability for local data needs. Moreover, NHIS should develop guidelines for the local staffing, funding, and uses of the data in these local areas. Contractual support and IPA personnel may be used for this technical assistance. However, the primary source of this service should be rendered by the professional staff of NCHS whose number and resources will probably need to be increased to accommodate this demand.

Section IV. Mission of the National Health Interview Survey Program

OBJECTIVES

The Technical Consulting Panel (TCP) reviewed the objectives of the NHIS and agreed on the following:

- To continue to give top priority to the collection and production of comprehensive health statistics for the total United States. The comprehensive health statistics that are encompassed in this objective and the purposes to which such data can be used are described in this section under "Comprehensive Health Statistics" and "Past and Present Uses of NHIS Data."
- To produce health statistics on a continuous basis.
- The data collected should meet accepted scientific standards for accuracy and reliability and presentation of data should include a description of the limits of such reliability and accuracy.
- To conduct research on survey techniques and estimation procedures so that the procedures used to collect data and to disseminate them are cost effective.
- To disseminate to State and local users the data obtained nationally and in subnational areas, and to share with them the experience gained in conducting health surveys, in research on survey methodology, and in the use and interpretation of health survey data.

COMPREHENSIVE HEALTH STATISTICS

Legislative Authority and Definition

In Section I.A., entitled the "Mission of Health Interview Survey Program," the objectives specify that the National Center for Health Statistics shall collect data on "comprehensive health statistics." The authority for and definition of comprehensive

health statistics can be found in Public Law 93-353, in two sections.

In Section 304(a)(1) and (2) of the public law, the Secretary for Health and Human Services was instructed under General Authority to undertake and support through the NCHS (and NCHSR) those statistical activities respecting:

- "(a) the determinants of an individual's health,
- "(b) the impact of the environment on individual health care,
- "(c) the accessibility, acceptability, planning, organization, technology, distribution, utilization, quality, and financing of systems for the delivery of preventive, personal, and mental health care, and
- "(d) individual and community knowledge of individual health and the systems for the delivery of health care."

To implement the mandate specified in Section 304(a), the National Center for Health Statistics was reestablished in Section 306(a) and the charge was detailed in an enumeration of duties under Section 306(b) as follows:

- "(b) in carrying out Section 304(a), the Secretary, acting through the Center, may—

"(1) collect statistics on—

"(A) the extent and nature of illness and disability of the population of the United States (or of any groupings of the people included in the population), including life expectancy, the incidence of various acute and chronic illnesses, and infant and maternal morbidity and mortality,

"(B) the impact of illness and disability of the population on the economy of the United States and on other

aspects of the well-being of its population (or of such groupings),

“(C) environmental, social, and other health hazards,

“(D) determinants of health,

“(E) health resources, including physicians, dentists, nurses, and other health professionals by specialty and type of practice and the supply of services by hospitals, extended care facilities, home health agencies, and other health institutions,

“(F) utilization of health care, including utilization of (i) ambulatory health services by specialties and types of practice of the health professionals providing such services, and (ii) services of hospitals, extended care facilities, home health agencies, and other institutions,

“(G) health care costs and financing, including the trends in health care prices and cost, the sources of payments for health care services, and Federal, State, and local governmental expenditures for health care services, and

“(H) family formation, growth, and dissolution; and

“(2) undertake and support (by grant or contract) research demonstrations, and evaluations respecting new or improved methods for obtaining current data on the matters referred to in paragraph (1).”

It is clear that NCHS has attempted to carry out the duties specified in Section 306(b) paragraph 1 by allocating tasks (A) through (H) to various divisions in the Center. In some cases, the assignment was unique to a single division and, in other cases, the duty was allocated to several divisions with one of them being designated as responsible for the final report. In meeting the mandate the National Health Interview Survey concentrates on data referred to

in paragraphs (1), (A), (B), (D), (F), and (G). The NHIS was charged with coordinating with the Triennial Family Growth Survey the data referred to in paragraph (1) (H). For data referred to in paragraphs (1) (A), (B), (C), (D), (F), and (G), it was necessary for NHIS to arrange for liaison and coordination with the Health and Nutrition Examination Survey (HANES). Finally, for data referred to in (1) (G), NHIS linkage with the National Medical Care Expenditure Survey (NMCES) was essential.

Although close coordination between separate Division's surveys in NCHS is obviously desirable with regard to definitions of terms and events, there are unfortunately occasions when the definitions vary according to previous practice and potential uses of the data. An example is the lack of uniformity on what constitutes a day of illness, or a physician contact. Although the needs of the separate data collection mechanisms are different because of Congressional mandates that take precedence, and there is an advantage to continue to collect data in a uniform manner, the variety of definitions presents a confusing and difficult picture for linkages and comparisons.

The authority and duties specified in Public Law 93-353 have been superseded recently by the passage of Public Law 95-623, the “Health Services Research, Health Statistics, and Health Care Technology Act of 1978.” The Technical Consultant Panel did take note of this new legislation and attempted to point out new directions and initiatives mandated therein regarding “comprehensive health statistics.”

Under the new legislation, the General Authority is broadened in Section 304(a)(1) to add epidemiological activities for the purpose of improving the effectiveness, efficiency, and quality of health services and health statistics in the United States.

Moreover, the four statistical activities outlined under Section 304(a)(2) have now been enlarged to 10 activities (only two of which are carryovers from the previous legislation) and the scope has been broadened to include statistical and epidemiological activities. Thus Section 304(a)(2) reads as follows:

“(2) In carrying out paragraph (1), the Secretary shall give appropriate emphasis to research, demonstrations, evaluations, and statistical and epidemiological activities respecting—

“(A) The accessibility, acceptability, planning, organization, distribution, utilization, and financing of systems for the delivery of health care,

- “(B) Alternative methods for measuring and evaluating the quality of systems for the delivery of health care,
- “(C) The collection, analysis, and dissemination of health related statistics,
- “(D) Alternative methods to improve and promote health statistical and epidemiological activities,
- “(E) The safety, efficacy, effectiveness, cost effectiveness, and social, economic, and ethical impacts of health care technologies,
- “(F) Alternative methods for disseminating knowledge concerning health and health related activities,
- “(G) The special health problems of low income and minority groups and the elderly to insure that these problems are assessed on a periodic regular basis,
- “(H) The prevention of illness, disability, and premature deaths in the United States,
- “(I) Health care costs, increases in such costs, and the reasons for such increases, and
- “(J) The impact of the environment on individual health and health care.”

(Items 2(A) and 2(J) are carryovers from Public Law 93-353.)

Most importantly, the new legislation in Public Law 95-623 provides under General Authority for a new Section, viz, 304(a)(3) in which the National Center for Health Statistics, the National Center for Health Services Research, and the National Center for Health Care Technology are authorized to undertake and support training activities to provide an expanded and continuing supply of individuals qualified to conduct the activities in Sections 305, 306, and 309. This is the first successful culmination of a 20-year attempt by NCHS to obtain authorization for training activities. Its implications for “comprehensive health statistics” are favorable provided funds are appropriated to implement such programs of training.

Under the detailed duties delegated to the National Center for Health Statistics under Section 306(b), there are again two striking changes. In the old legislation the authorization to the Center said it “may” collect statistics on (A) through (H). The new legislation substitutes the word “shall” for “may.”

The second change is to add two paragraphs to Section 306(b) and to refer to them as paragraphs (3) and (4). These two paragraphs are vital in (1) giving authority to undertake and support intramurally, as well as by grant or contract, epidemiological research on the topics involved and (2) giving authority to analyze statistics on a collaborative basis with other agencies, national and subnational, on a cost-sharing basis. The two paragraphs read as follows:

“(3) may undertake and support (by grant or contract) epidemiological research, demonstrations, and evaluations on the matters referred to in paragraph (a); and

“(4) may collect, furnish, tabulate, and analyze statistics, and prepare studies, on matters referred to in paragraph (1) upon request of public and nonprofit private entities under arrangements under which the entities will pay the cost of the service provided.”

Finally, Section 306 is amended by redesignating subsection (i) as subsection (k) and by inserting after subsection (h) the following new subsection:

“(i) The Center may provide to public and nonprofit entities engaged in health planning activities technical assistance in the effective use in such activities of statistics collected or compiled by the Center.”

This authorization to provide technical assistance and the authority under Section 306(b)(4) to charge for the services dovetails with the Panel’s Recommendation D.3 for the Center to provide technical assistance to agencies involved in collecting, tabulating, and analyzing data on a subnational basis.

Environmental Health Data

Under Section 103 of Public Law 93-353, the “Health Research, Health Statistics, and Medical Libraries Act of 1974,” NCHS was mandated to collect data on “the impact of the environment on individual health and on health care.” This respon-

sibility was further specified under Section 105 which added a new section to the Public Health Service Act, Section 306(b)(1), viz, "(c) environmental, social and other health hazards." Public Law 95-623, the "Health Services Research, Health Statistics and Health Care Technology Act of 1978" reaffirmed these responsibilities.

The collection of data by the National Health Interview Survey relating to environment and its impact on health is clearly defined in a publication of NCHS prepared by another Technical Consultant Panel under the NCVHS. The recommendations of that TCP are clear-cut and straightforward and are enumerated on pages 2-4 of the referenced publication.¹

Attention is particularly directed to the following Recommendations:

- "3.1 Identification of excesses in mortality and morbidity in occupational groups.
- "3.2 Analysis of variation in morbidity and mortality by age, race, sex, economic status, time of year, and geographic area in order to detect or obtain evidence pointing toward environmental effects.
- "3.3 Detection of disease or impairment gradients which may be related to community air quality, including sulfur oxides and particulate matter, photochemical oxidants, and pollutants emitted from mines, mills, or smelters.
- "3.5 Detection of disease or impairment which may be related to water quality including the presence of organic compounds, "hardness," heavy metals, and viral and other
- "3.6 Early identification of rare types of mortality and morbidity associated with environmental exposures."

Recommendations 6.1, 6.2, and 6.3 on page 4 of the referenced publication are specifically earmarked as ongoing activities to be established by NCHS's National Health Interview Survey.

Furthermore, attention of the NHIS staff should also be called to the publication entitled *Environmental Monitoring*, Volume IV of Analytical Studies for the U.S. Environmental Protection Agency that was undertaken and prepared by the National Academy of Sciences in 1977. This publication devotes pages 39-53 to "Health Effects Monitoring and Epidemiology."

Core and Supplemental Questions Under Comprehensive Health Statistics

To carry out its mandate to collect and analyze these comprehensive health statistics, the Division of Health Interview Statistics (DHIS) classified each item as either "core" or "supplement." If core, the question is asked every year and modified only after a relatively lengthy period, such as every 10 years. If supplement, the question is asked only for a finite period of time, such as for 1 year or perhaps even a fraction of 1 year.

The core items are designed to accumulate enough experience about incidence, prevalence, and temporal trends and to relate these to precise data provided by the U.S. Bureau of the Census every 10 years. For this reason, the practice has been not to consider items as core unless there was assurance the question would remain on the survey for a period of not less than 10 years. On the other hand, the supplemental items may be of special current interest (e.g., Swine flu, Guillain-Barre syndrome, Legionnaire's disease) or require less experience in developing trends or reference points so that the periodicity can be 1 year, a fraction of 1 year, or segments of 1 year repeated every several years.

Further discussion to distinguish more specifically core and supplemental questions can be found in Section V, "Recommendations."

PAST AND PRESENT USES OF NHIS DATA

"How are NHIS data used?" is a perennially asked but only partially answered question. A study was completed in 1969 by Booz, Allen, and Hamilton, Inc., under a contract to identify NCHS data users and uses made of the data. A universe of potential data users was identified and stratified into 5 type-of-user classes as follows: (1) Federal government, (2) State and local government, (3) planning groups and nonprofit private agencies, (4) universities and hospitals, and (5) other private organizations. Then a stratified sample of 952 recent users of NCHS data was contacted. Respondents were asked about data needs in general as well as about their most recent use of NCHS data. When asked to rank five specific types of data detail, the following order (highest to lowest) resulted:

- Demographic, social, and economic detail

- Comparisons over time
- Geographic detail
- Diagnostic detail
- Longitudinal data.

Permitted to check only one level of geographic detail, 23 percent indicated a need for national data, 20 percent State, 14 percent regional, and 37 percent expressed a need for data at the sub-State level. Over 50 percent of the users said they required the precision of their estimates to be within plus or minus 5 percent.

When asked about their specific use of NCHS data: (1) 36 percent said they had to manipulate the data in the published report; (2) 20 percent said the magnitude of the estimate was more important than the comparison of two or more figures, 55 percent said the comparison of two or more estimates was more important; (3) 32 percent made geographic comparisons; (4) 30 percent made time comparisons; and (5) 55 percent combined NCHS data with data from other sources.

The findings were somewhat limited due to problems related to study design. However, a 1973 paper written by Woolsey and Perrin entitled, "Assuring the Usefulness of National Health Statistics Systems" describes the study and findings.²

In the areas of health planning and policy formulation, decisionmaking is a complex undertaking that utilizes information from a variety of sources including NHIS data, opinions of experts, direct observation, and data collected from other sources. While it would be misleading to single out the data from NHIS as the only major tool used in a decision-making process, many examples, however, of the users of NHIS data in major government programs may be given. For example, estimates of health problems and resultant utilization of health care services were used in formulating the legislation for both the Medicare and Medicaid programs. Special computations on particular population groups have also been developed and provided as input to various White House conferences and for other special purposes.

In 1964 and again in 1970 NHIS was used to evaluate population exposure and estimate levels of radiation from dental and medical X-rays. Working jointly with the Bureau of Radiological Health, the Division of Health Interview Statistics identified a representative sample of the U.S. population with recent X-ray exposure and obtained permission to contact the facility for additional information. Based

on data obtained from the household and facility surveys, national estimates were made in 1964 and 1970 for (1) number of persons X-rayed, (2) number of X-ray visits, (3) number of X-ray examinations and films, (4) exposure rates, (5) estimates of gonadal and genetically significant dose, and (6) X-ray machine characteristics. These data provided conclusive evidence of the wide variations in exposure being received by persons throughout the United States. As a result of these surveys a national program to evaluate X-ray trends and to promote the safe and efficient use of X-ray equipment was established and is currently being administered by the Division of Radiological Health. These data undoubtedly influenced the passage of Public Law 9602 which established criteria for new X-ray equipment. In addition, results of these surveys (1) confirmed the excessive exposure due to the use of photofluorographic equipment (used mainly in mass screening facilities) and (2) were used to monitor the effect of an ongoing Public Health Service program to eliminate mass X-ray screening.

Increased interest in cost-benefit analysis applied to public health programs in the 1960's gave rise to a number of cost-effectiveness studies related to categorical diseases. In a number of these studies (e.g., arthritis and diabetes) Dorothy Rice's model for estimating costs of illness was combined with NHIS data to estimate both direct (e.g., expenditures for physician visits, hospitalizations, and medications) and indirect costs (i.e., economic loss due to premature death, disability, and work loss) due to illness. The cost of illness studies for arthritis and diabetes were repeated in the 1970's. The most recent application of this type of analysis was undertaken by Dr. Fred Payne (an epidemiologist with National Institute of Allergy and Infectious Diseases), whose interest was in estimating costs due to chronic asthma and hayfever.

Both the *Report of the National Commission on Diabetes* (DHEW Publication Number (NIH) 76-1019) and the 1976 Fogarty report *Diabetes Mellitus* (DHEW Publication Number (NIH) 76-854) used data from NHIS to describe the magnitude of the problem and to assess the demographic and socioeconomic characteristics of persons with "known" diabetes.

In 1957 NHIS was used to assist in monitoring the influenza epidemic. During the Swine flu scare in 1976, NHIS was used in conjunction with other programs at the Center for Disease Control to monitor the incidence of "flu like" illnesses, the incidence of flu shots, and to identify characteristics of the population receiving shots.

The most recent *Statistical Abstract of the United States*, published by the U.S. Bureau of the Census,

contains numerous descriptive tables of NHIS results. Many of the statistics presented in this publication show 5 to 10 year trends for the core variables collected by NHIS. Results from the NHIS also appear in *Social Indicators*, a publication of the Office of Federal Statistical Policy and Standards.

Earlier this year NHIS prevalence data (1965-1975) as well as NHIS estimates of the proportion of known diabetics taking insulin were used by the National Diabetes Advisory Board's *ad hoc* committee studying insulin requirements in the year 2000. The Division of Health Interview Statistics is currently working with the National Diabetes Data Group, an advisory group to the National Institute of Arthritis, Metabolism, and Digestive Diseases (NIAMDD), and with Dr. Maureen Harris at NIAMDD exploring ways in which NHIS diabetes data might be better used by the clinician and epidemiologist.

Special data runs are provided to other Federal agencies to assist in the evaluation of their own programs or in the evaluation of legislative proposals. For example, the Congressional Budget Office has recently provided with numerous tabulations of NHIS utilization, disability, and insurance coverage statistics to be used in studying various national health insurance alternatives.

In response to data needs expressed by the Department of Health and Human Services' Office of Health Initiatives, two supplemental topics were added to the NHIS questionnaire. Beginning in July of 1978, the addition of a series of questions related to smoking habits has provided the Office of Smoking and Health with estimates on the smoking status of persons in the United States and data on the levels of tar, nicotine, and carbon monoxide consumed by current smokers. In January 1979 a Childhood Immunization Supplement was included on the Survey that will provide data on the incidence of shots against DPT, Poliomyelitis, mumps, and measles in children.

Materials on sample design, collection procedures, training manuals, questionnaires, etc., have been provided to individuals at universities for use in teaching. Similar materials as well as national and subnational data from NHIS have been provided to State and local planning agencies as part of the technical assistance program.

In the 1974 reorganization of the National Center for Health Statistics, two new divisions were created which are using data from NHIS. The Division of Analysis uses NHIS as a source of data for *Health United States*, an annual report to Congress. In studying the question of access to care, the Division of Analysis is using NHIS data to compare utilization of services with supply of medical re-

sources. The Office of Statistical Research is using NHIS data in three major methodological areas: (1) developing an appropriate multivariate analysis procedure based on weighted least squares analysis of categorical data, (2) developing a time series analysis procedure appropriate to NHIS data, and (3) procuring small area estimates for use by State and local planning agencies.

Users from private industry rely on NHIS data for estimates of persons with particular health problems for whom advertising campaigns or new products are directed. The potential demand for special aids or devices for persons with functional limitations are often assessed using NHIS data.

FUTURE USES OF NHIS DATA

For the future, the TCP wishes to encourage policy-oriented, complete analyses. The development of the Division of Analysis is very important. Although others outside of NCHS analyze NHIS data, clearly NCHS is in the best position to produce meaningful analytic products. The more NHIS data can be presented in a form that addresses important policy or analysis questions, the more valuable they will be.

The TCP also wishes to encourage increased flexibility in the kinds of data to be collected. This may require the reduction of the core items of NHIS. By increasing the "optional section" and developing a mechanism for inclusion of new subject areas, a wider range of data needs can be served.

Two types of data particularly warrant attention—timely data and denominator data. The NHIS has, from time to time, been used to collect data needed or wanted because of a current problem or priority. Examples include monitoring flu shots and epidemics and the recent focus on smoking. Although NHIS should not abandon its commitment to measuring trends over time, increased flexibility to respond to such data needs is desirable.

One use that has seldom been made of the NHIS that has potential benefits is the collection of denominator data. In clinical studies, observations are frequently made of conditions or factors that appear to be related to disease or outcomes—coffee consumption, aspirin consumption, obesity. What is needed to interpret such findings often are estimates of the distribution of such factors for the population as a whole, or some subgroups. Increasing the flexibility of NHIS will increase its potential to serve this function in medical research.

Finally, although NHIS can be analyzed in numerous ways, one particular potential of great value is to carry out studies of the relationship between contextual variables—such as the supply or mix of physicians, the levels of air pollution, or the population density—and health care utilization patterns or health status variables. To do these analyses, essentially NHIS interviews need to be linked to

other data sets on an area-specific basis. Zip codes or town codes can be used. Owing to the fact that such analytical linkages are important to a number of policy questions, the TCP will urge, under recommendations, that research be undertaken to make such linkages and analyses feasible on a routine basis.

Section V. Recommendations

CONTENTS OF THE NATIONAL HEALTH INTERVIEW SURVEY

Introduction

The NHIS questionnaire consists of a set of basic, or core, questions relating to health about which information is collected every year and a number of supplementary questions that are either asked periodically at more or less regular intervals (standard or rotating supplements) or included on a one-time basis (special or occasional supplements). Both the standard and special supplements can either deal with topics not covered by the core questions or expand questions relating to one of the core items.

The core items about which information has been collected continuously since the beginning of the Survey include—in addition to the sociodemographic characteristics of the persons in the sample—acute conditions and injuries, chronic conditions, days of disability due to acute or chronic conditions, limitation of activity caused by chronic conditions, and hospitalization. Since 1968, information on physician and dentist visits has been collected as part of the core questionnaire. Still more recently, several additional topics have been incorporated into the core, most notably questions about health status, health insurance, Medicaid, eligibility for Veterans Administration benefits, and height and weight. Examples of standard supplements include questions about personal health expenditures, smoking habits, X-ray visits, and vision and hearing impairments, while special supplements have collected information about arthritis, diabetes, motor vehicle accidents, and preventive care, to mention just a few topics.

While an important function of the NHIS is to provide basic data on health-related matters on a continuing basis, it must also be flexible enough to respond to changing data needs, dropping questions on subjects that have become of less interest, and introducing more timely subjects. Moreover, since there are limits to the amount of information which can be obtained in a household interview, the introduction of new items may require elimination or shortening of existing core items. The TCP discussed at some length this conflict between assuring continuity on the one hand and making NHIS more flex-

ible to serve new data needs on the other. One suggestion was to eliminate the core items entirely and have a different set of questions every year. However, the consensus of the TCP was against such a drastic change. Instead, the TCP favored reductions in some core items and the addition of some questions on certain new topics as supplementary items. In the following, the recommendations of the TCP regarding the content of the NHIS are presented.

Core Items—Recommended Deletions and Modifications

Chronic conditions.—The item relating to chronic conditions is the major core item about which the TCP had serious reservations. The TCP concluded that present procedures result in data of doubtful validity and little practical utility which do not justify the considerable amount of interview and coding time involved in obtaining and processing them. Before detailing the Panel's criticisms and recommendations, a few words explaining the NHIS core items relating to chronic conditions are necessary.

At present (and for the past 10 years), data on chronic conditions come from the following questions in four sections of the core NHIS questionnaire (question and page numbers refer to the 1978 NHIS questionnaire):

- Questions 5 through 11, pp. 2-4, on 2-week disability days (i.e., days in bed, lost from work or school, and of reduced activity); answers to these questions may relate to both acute and chronic conditions.
- Questions 21 through 28, pp. 8-9, on current limitation of activity due to chronic conditions.
- Question 32, pp. 12-15, checklist of chronic conditions. In 1978 this checklist contained 131 conditions that were grouped in six broad categories, each of which covered one system or group of systems of the body (e.g., respiratory, circulatory, nervous). The sample population was also divided into six groups, and each

was asked about one system or group of systems only. In previous years (1968 through 1977), the list of chronic conditions in any given collection year was limited to one system or group of systems of the body so that it took several years before all conditions were covered.

- Condition pages, pp. 18-31. These contain the detailed questions asked about every condition reported in the questionnaire. Questions 1 through 9 relate to disability days, date of onset of the condition, and date when a doctor was last consulted about the condition; these are asked for both chronic and acute conditions. Questions 11 through 16, asked for chronic conditions only, relate to medication taken, hospitalization and surgery, number of physician visits in the past 12 months, number of bed days lost from work, and how often and how much the condition bothered the person. Questions 17 through 21 are asked for accidents and injuries and relate to date and place of the accident or injury and part of the body affected.

It is also important to note that all conditions reported in the questionnaire are coded to the four-digit code of the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA).

The TCP made the following criticisms of the current NHIS procedures regarding chronic conditions:

- Household interviews do not yield prevalence data that are precise enough to be used in epidemiological studies. Coding such data to the ICDA not only is wasteful of resources that could be better spent in other areas of the NHIS but lends the data an appearance of accuracy and precision which is unjustified.
- The usefulness of much of the detailed information currently collected about chronic conditions (i.e., Questions 11 through 16 on the condition pages of the questionnaire referred to above) is highly dubious.
- Collecting detailed information about all chronic conditions reported by a person is wasteful. Anyone suffering from several chronic conditions finds it impossible to allocate disability days, physician visits, etc., as between the different conditions.

Despite these criticisms, the TCP was not willing to recommend the elimination of chronic conditions from the NHIS. It was felt that by limiting the number of chronic conditions for which data are collected, and by some other changes in procedure, useful estimates of prevalence rates for some chronic conditions would be obtained through the NHIS.

Accordingly, the TCP recommends the following to NCHS:

- Shorten the list of chronic conditions in the core part of the NHIS to eliminate those conditions for which useful prevalence rates cannot be estimated.
- Cease coding chronic conditions to the four-digit code of the ICDA since this is not only time-consuming and delays publication of data but also implies a level of accuracy and reliability that is not warranted.
- Examine the usefulness of all detailed core questions about chronic conditions and consider limiting them to those necessary for establishing the prevalence of the condition, the date of onset, and whether or not medical attention was sought.
- At intervals to be determined, issue a standard supplement on chronic conditions. The TCP recommends further that NHIS in such supplements focus on a major disease category and ask a set of validated questions prepared specifically for this disease category that will provide more useful information about this particular disease category than the more general questions asked about chronic conditions in the current version of the NHIS.
- Examine the validity of NHIS diagnostic data by checking the correspondence between the diagnostic label attached to the reported condition and the underlying disease condition as determined by a clinical examination.
- Investigate the feasibility of using a reported symptom approach to obtain prevalence data about chronic conditions.
- In the development of strategies for implementing the above recommendations, NCHS should make liberal use of consultations with epidemiologists and clinicians experienced in the measurement of chronic and acute condi-

tions. A physician epidemiologist should be made available to NCHS on a regular basis to advise on ways of using the NHIS for measurement of the prevalence and incidence of disease.

The TCP wishes to stress that these changes will not only reduce interview time and, thus, allow more time for other items but also substantially reduce coding time and free funds for more essential tasks.

Acute conditions.—The TCP felt that most of the criticisms of and recommendations regarding the treatment of chronic conditions in the NHIS applied equally well to that of acute conditions. In particular, the TCP recommends that NCHS cease coding acute conditions to the four-digit code of the ICDA and that it explore the feasibility of using a reported symptoms approach for obtaining data on the incidence of acute conditions.

Height and weight.—Some members of the TCP expressed doubts whether information about height and weight was important enough to be included among the core items of the NHIS. A question about height and weight has been on the core questionnaire since the beginning of 1976. Its purpose is to identify persons with weight problems since obesity is an important predictor of other health problems, such as hypertension. The TCP was divided on the issue of continued inclusion of this item and recommends that DHIS explore whether and how the data are used, how useful they are, and whether it is really necessary to include the item every year.

Recommended Supplements

The TCP found that there were three areas where the NHIS might be expanded to fill some basic data needs: mental health, occupational and environmental health, and health insurance and expenditures. To date, NHIS has not included any questions on the first two topics, either in the core items or in supplements. The TCP recommends that NCHS consult with the relevant Federal agencies (National Institute of Mental Health, Environmental Protection Agency, National Institute for Occupational Safety and Health, Occupational Safety and Health Administration) and other interested groups as to which of their data needs could most efficiently be met through use of NHIS and how often questions relating to these topics should be included. Perhaps some data on mental health could be collected by adding a schedule of symptoms related to common mental diseases and by asking about visits to nonphysician therapists, such as psychologists, counselors, etc. Similarly,

information about occupational or environmental health problems including noise, could be obtained by some questions about certain conditions associated with occupational, home, and other environmental hazards.

Health insurance and health care expenditures are areas in which NHIS already collects, or at various times has collected, some data. Questions about health insurance were included as supplements in 1960 and 1963 and then every other year starting in 1968. In addition, NHIS now includes some questions about eligibility for Medicaid and Veterans Administration health care benefits. Personal health care expenditures were included as supplements in 1963, 1971, 1975, 1976, and 1978. Although it now seems that a national health insurance program will not be enacted for some years to come, it is clear that additional data on health insurance and expenditures will be needed, both before and after such a program is in operation. A good part of these data needs will be filled by the new National Medical Care Utilization and Expenditures Survey (NMCUES) that NCHS plans to conduct on a regular basis. This survey will be a successor (though on a more modest scale) to the 1977 National Medical Care Expenditure Survey, which provided detailed data on health insurance and expenditures and on physician visits, dental visits, hospital stays, and the use of prescription drugs. The TCP is, therefore, not recommending an expansion of the NHIS in the area of health insurance and health care expenditures at this time but goes on record that an expansion will be needed if for any reason plans for the NMCUES do not materialize. However, the TCP recommends that in any case the NHIS continue to include its questions on physician and dentist visits and on hospitalizations. For one thing, continuity of these data series is highly desirable. For another, the sample of NMCUES as currently planned will be considerably smaller (5,000 to 6,000 households is the figure currently considered), which will limit the scope for examining interrelationships and breakdowns into smaller groups.

Sociodemographic Variables

The variables used in the NHIS are age, sex, marital status, race and ethnicity, education, family income, occupation and industry, and place of residence. While the TCP has no major criticisms of these variables, it recommends that NCHS:

- Use the standard definitions and classifications that exist, and bring to the attention of the

Office of Federal Statistical Policy and Standards the need for uniformity in instances where there are currently differences.

- “Modernize” some code categories; e.g., expand marital status to include living together, disaggregate the age groups 65 years and over to reflect the increased proportion of persons aged 75 years and over.
- Consider adding religious preference as another descriptor, since this has been found to be correlated with health attitudes and practices.

Procedures for Adding Items to the NHIS

The TCP found that the mechanism used by NCHS for selecting new items to be added to the NHIS—either to the core or as standard or special supplements—could be improved. To insure that a wide range of health information interests would have an opportunity to be reflected in the contents of NHIS, the TCP recommends that NCHS:

- Every 2 or 3 years disseminate requests for items to be added to the NHIS as widely as possible, not only to Federal agencies but also to other users of health information.
- Develop a standard form for requests. This form should require the following information:
 - (1) The purpose, geographic unit of representation, prospective users, expected uses of the data, and the analytic techniques to be applied to them;
 - (2) the desired frequency of inclusion in the NHIS (annually, one-time, at intervals of several years);
 - (3) the reason why other methods of collecting the data are less satisfactory than the use of NHIS.
- Appoint a panel of outside advisors to review the requests. These advisors, working with NCHS staff, would make the final decisions on requests based on the quality of the data that could be collected, the variety of uses to which the data could be put, the resources that would be required to collect and process the data, and the appropriateness of the request to NHIS. In addition to aiding in the review of solicited

topics from users, the panel would also meet with NCHS staff, perhaps on an annual basis, to review use of questions in the core and the supplements. Infrequently used questions might be considered for elimination. Another function of this advisory panel would be to monitor the timeliness of reports which, in turn, assumes provision of an adequate mechanism for analysis. Members of the panel as individuals with special expertise could also be called upon to provide technical assistance for users.

METHODOLOGY

Applying the Principles of Total Survey Design to the National Health Interview Survey

In tracing the historical development of sample survey methodology, one finds that the initial emphasis was on sample design, which took as its objective the minimization of sampling error for a fixed survey budget, or, alternatively, achieving desired levels of sampling error for the lowest possible cost.

As survey experience accumulated, it became obvious that measurement or nonsampling errors could not be ignored. Attempts were made to measure and develop methods of reducing nonsampling errors arising from various sources and in various phases of surveys. However, until recently, different kinds of nonsampling error were dealt with in an isolated manner and the design of most new surveys continued to put major emphasis on sampling error.

In the early 1960's, Morris Hansen, William Hurwitz, and other statisticians at the U.S. Bureau of the Census developed what has come to be known variously as the “Census Bureau survey model or the Census Bureau response error model.” This model partitions total error of estimation into sampling error, response variance bias, and interaction terms. It provides a theoretical basis for evaluating the effects of alternative survey design features on total error and, thus, makes possible a systematic approach to total survey design, which is defined by Dalenius and others as “survey design aiming at an overall economic balance between sampling and nonsampling errors in a survey.”³

Total Survey Design is not a magic formula for producing optimum survey design. Effective application of TSD principles requires (1) that the survey data objectives be clearly specified and (2) that data

be available on the error structure associated with alternative design features. Usually these conditions are not fully met. Nevertheless, the basic principles of TSD can and should be applied to the extent possible, given the knowledge of data objectives and error structure available to the survey designer.

The NCHS has pioneered the application of TSD principles to new surveys, with the National Medical Expenditure Survey providing an outstanding example. However, the TCP finds that NCHS has not sufficiently applied these principles to the improvement of continuing surveys such as NHIS.

The initial design of the NHIS in 1957 was sound, given the status of survey theory and the knowledge of objectives and error structure at that time. Since 1957 new data requirements have evolved and a large amount of new information on the error structure of alternative survey procedures has been developed from the survey itself and from methodological studies and analyses conducted by NCHS and others. There have been some changes in the NHIS sample design in order to increase the sample size and to update the sampling frame after each census. In response to methodological research findings, there have been changes in the structure of the questionnaire, the wording of specific items, the length of recall period for deleted items, and respondent rules.

On the other hand, the TCP has received no evidence of any systematic attempt to evaluate significant alternatives to the present design, such as the use of a panel design with bounded interviews and partial rotation of the sample, or the regular use of record checks to adjust for reporting biases for some items. The possible use of a panel design was discussed by Woolsey and Perrin (1973).² At that time the panel approach was rejected because of insufficient evidence on the kinds of uses that are made of NHIS data. The authors vowed to "begin to try to collect such evidence before another review of the survey design was made"; however, the effort does not seem to have been pursued.

Until recently, the general approach to assisting State and local health agencies to conduct health interview surveys has been to recommend a mini-version of the national survey. Considering the level of financial and technical resources normally available for State and local health surveys, it is questionable that high unit cost personal interview surveys are the best option for these agencies.

The TCP recommends that NCHS make a commitment to apply the principles of Total Survey Design, both in redesigning the national survey after the 1980 census and in assisting State and local

health agencies to design health interview surveys. Application of TSD principles will probably require additional studies to measure critical components of error as well as costs of alternative procedures. Further recommendations relating to the redesign of the national survey appear in the section "Redesign of the National Health Interview Survey Following the 1980 Census."

With respect to technical assistance activities, the TCP wishes to encourage the Center's recently announced initiative to develop facilities for and expertise in the conduct of State and local health surveys by telephone, using random-digit dialing and computer-assisted interviews. (Fuchsberg and Sirken, 1978.)⁴

Total Survey Design principles should also be used to evaluate proposals for methods of obtaining information for proposed new core and supplemental items.

Strengthening the National Health Interview Survey and its Resources

The TCP reached a consensus that additional resources were needed by NCHS in order to strengthen and expand the capacity of the NHIS as a source of data on the health status of the population, use of health care services and related subjects, and strengthen the capacity of the Center to provide technical assistance to State and local health agencies in health interview survey methods and the uses of health interview survey data.

In order that this recommendation might be considered in the development of the NCHS budget for fiscal year 1980, it was approved by the TCP and transmitted by the Chairman to the Chairman of the National Committee on Vital and Health Statistics in a letter dated July 21, 1978. The text of this recommendation (with minor revisions in wording) is repeated here.

"The Health Interview Survey was established as a mechanism for securing information on the health status of the population, utilization of health care, and related matters through scientific sampling and direct interviewing of the public in their homes. Over the past two decades the Survey has provided valuable data on a wide variety of topics. Even so, increasing demand for wider coverage of subject matter and greater detail make it clear that the mechanism must be substantially strengthened. Increasing the capacity of the Survey will make it possible to assemble and analyze in greater depth otherwise unavailable evidence necessary to understanding of prevailing health conditions, to effective health planning, to

construction of baselines for epidemiological investigations, and to study the impact of environment on health.

"It is recommended that the National Center for Health Statistics strengthen the Survey to make it more flexible and especially to increase its capacity to produce more detailed and reliable data for different demographic, socio-economic and geographic sectors of the population on a more timely basis. The NCHS should also explore different ways of strengthening the total survey design so that this goal can be accomplished in the most cost-effective way. The budget of the National Center for Health Statistics will probably need to be increased in order to permit such strengthening of the Survey.

"There has been a growing need and demand for data from the Health Interview Survey which can be disaggregated by region, State, Standard Metropolitan Statistical Area (SMSA) and Health Systems Agency (HSA). Although strengthening of the Survey and increasing its capacity will make some progress toward this end, the regular collection and publication of data for these subnational areas in the Health Interview Survey is not an efficient use of national resources. A more suitable and practical method is for the National Center for Health Statistics to provide a complete range of technical assistance and demonstration activities on health interview survey methods and uses of health interview survey data to agencies and organizations which are in need of such assistance on specific questions and at varying times. In developing this program of technical assistance, full consideration should be given to the use of relatively low-cost data collection methods, such as mail and telephone, when and where they can be expected to produce data of adequate scope and reliability to meet local requirements.

"It is recommended that NCHS develop such a program of technical assistance and establish criteria of funding, staffing, and survey design to guide these subnational groups in formulating their plans to collect, use, and evaluate health interview survey data. Contractual support for providing technical assistance may be used as deemed desirable by NCHS but the primary source of service should be rendered by professional staff of NCHS whose number and resources may need to be increased for this specific purpose."

Continuous Versus Periodic Surveys

Questions have been asked from time to time, especially in connection with budget reviews, as to

whether it might be preferable to convert NHIS from a continuous survey to a periodic survey conducted at regular intervals, such as every 2nd, 4th, or 5th year. The principal argument for this proposal is usually that the time-series data on topics such as acute and chronic conditions and utilization of health services do not change very much from year to year, so that less-than-annual readings would be sufficient.

A reasonable approach to evaluation of these alternatives is to assume that for a period of n years we have a fixed total budget, C , and our choices are (1) to use that budget to collect data continuously during the n -year period, or (2) to conduct m separate surveys ($m < n$) spaced at equal intervals during the n -year period. To make the model more concrete, let us consider the alternatives of (1) a continuous survey during a 12-year period or (2) four separate surveys, spaced at 3-year intervals.

We need to consider both the kinds of data that can be obtained under the two approaches and, in accordance with the principles of Total Survey Design described earlier, the error structure of the data.

With respect to the data that can be obtained by the two approaches, the following observations can be made:

- With the periodic approach, no direct estimates will be possible for the 8 out of 12 "off years."
- On the average, it will take longer with the periodic approach to introduce new data items into the survey. Virtually instant response, as illustrated by the data obtained for the Swine flu immunization program, will not be possible.

In discussing error structure, we make the further assumption that total samples or the surveys conducted every 3rd year will be roughly equal in size to the samples accumulated over a 3-year period with the continuous approach. There are certain economies under either system but the unit costs of interviewing, which make up a large part of the total, should be about the same.

With this assumption, the following observations can be made about error structure of the two approaches:

- The relative sampling errors for single-year estimates from the periodic surveys will be about the same as the relative sampling errors for cumulative 3-year estimates from the continuous survey. Single-year estimates from the continuous survey will, of course, have larger sampling errors than those from the periodic

surveys; however, the latter will be available only for 4 years out of 12.

- Experience in NHIS and other continuous surveys has demonstrated that an interviewer learning process occurs when interviewers start work on a new survey. This learning process often goes on for several months before error rates stabilize at a low level. As a result, the contributions of interviewer bias and interviewer variance to total error are greater whenever there are substantial numbers of inexperienced interviewers working on a survey. There is also some evidence that interviewers employed over a long period of time may experience a fatigue factor, and steps must be taken to minimize this problem. The “learning errors” are greater in periodic surveys but the “fatigue errors” would be expected to be in the opposite direction. On balance, however, the “learning errors” from periodic surveys could be expected to have a greater deleterious impact on estimates than the “fatigue errors” would on estimates from continuing surveys.
- The two modes would have a different impact on the survey support staffs—those who prepare questionnaires and training materials, supervise data collection, and plan and carry out data processing procedures. We would expect the continuity of experience under the continuous survey approach to minimize errors from this source.

The recommendation of the TCP is that the continuous survey approach used for NHIS has substantial advantages over less-than-annual periodic surveys, and opposes any change at this time. Periodic surveys should be considered as an alternative only if it were necessary to reduce very substantially the total multi-year budget for health interview surveys.

Redesign of the National Health Interview Survey Following the 1980 Census

The NHIS sample design is closely linked to that of the Current Population Survey and other sample surveys conducted by the U.S. Bureau of the Census. Data are collected in a subset of the CPS sample primary sampling units (PSU's) and the sampling frame within the sample PSU's is derived from the 1970 census, with appropriate mechanisms for updating.

The U.S. Bureau of the Census revises its PSU

design and updates its Census-based frames following each decennial census. Following the 1980 census, the U.S. Bureau of the Census intends to redefine its strata so that they do not cross State boundaries. This would improve the reliability of State estimates. Thus NCHS will, as a matter of course, need to keep abreast of the plans for the post-1980 census (or alternatively, to consider the possibility of having the survey conducted by other means).

While minor survey design changes can be implemented at almost any time in the NHIS (preferably at the beginning of a new survey year), it is probably desirable to restrict the frequency of more extensive changes, especially those that may cause discontinuities in time-series data. Because the redesign of the sample following the decennial census is likely to be a major revision, it would be desirable to incorporate any other contemplated major nonsampling changes in the new design of the NHIS at that time.

The TCP recommends that, starting as soon as possible, NCHS should undertake a comprehensive and intensive review of the NHIS design. This review should include, but not necessarily be limited to, an evaluation of the following design alternatives:

- Cross-sectional versus longitudinal (panel) approach.
- Respondent rules (extent to which proxies are permitted).
- Length of reference period for different items.
- Use of diaries and other aids to recall.
- Use of administrative record data to supplement or adjust data obtained through interviews.
- Interview methodology, such as the use of verbal reinforcement in interviews.
- Design of the sample to improve the reliability of State estimates.
- Use of alternative approaches for eliciting information on chronic conditions, such as long versus short question sets or sets for specific conditions that have been validated by other users.
- Use of long-term (say 5- or 10-year) follow-backs to survey respondents to measure health effects of exposure to varying environments and personal habits and life style.

The review should be carried out by qualified individuals relieved of any responsibility for ongoing survey operations. If this cannot be arranged within NCHS, an appropriate contractual arrangement should be developed.

The review should be completed and decisions on major design changes reached in time for implementation at the time of the post-1980 census sample revision.

Methodological Research

The TCP heard occasional reports on methodological research in the NHIS but made no attempt to conduct a complete inventory of such research. However, it is clear that such methodological research carried out since the start of the NHIS has provided a wealth of information on the error structure of health variables, and the TCP believes that use of this information in the framework of total survey design can lead to significant improvements in the NHIS design. Nevertheless, there are new data requirements (e.g., information on alcoholism) about which little is known, and new data collection and processing technologies, such as random-digit dialing and computer-assisted telephone interviewing, whose error structures are just beginning to be studied. Members of the TCP feel that there is also need for research on how to improve the quality of data on health conditions. Other data requirements and new technologies are certain to lie in the future.

The TCP recommends resumption of the former practice whereby at least 10-percent of the NHIS budget for both the national survey and technical assistance activities for each fiscal year was allocated to methodological and developmental research. These funds should be used to support methodological experiments built into the ongoing NHIS, developmental work on procedures for meeting new data requirements, independent methodological tests, special studies to measure components of error, experimentation with linkages to other NCHS surveys, and other relevant activities.

Cross-Analysis With Other Data Sets

The NHIS is but one of a large number of data sets maintained by the Federal Government and it should not be analyzed in isolation from relevant information provided by other data sets. In the investigation of etiologic or policy relevant issues, one data set can be used to elaborate on and sometimes to settle issues raised by another. The NHIS, because it provides information on the characteristics

of individuals, is particularly useful for investigating the significance of variations demonstrated at the population level through routine data sets such as the Uniform Hospital Discharge Data Set (UHDDS) or mortality data. For example, when the UHDDS is used to measure hospital discharge rates among neighboring communities, striking variations in per capita use of medical care services are observed. As is pointed out in the section "The Role of the National Health Interview Survey in Meeting Subnational Data Needs," the existence of these variations presents a dilemma to the planning agencies: Are they related to differences in characteristics of the individuals located in the areas? Are they related to differences in supply characteristics? The answers to questions regarding variations in usual medical care services will be crucial in the decision to allocate additional resources to populations.^b

Conjoint use of the NHIS-mortality data sets offers opportunities to investigate etiological hypotheses concerning the causes of geographical variations in mortality rates such as those demonstrated by the National Cancer Institute's Cancer Atlas. By stratifying geographical regions according to their standardized mortality ratios, subpopulations can be identified for reanalysis of NHIS data to test (on a case control basis) specific etiological hypotheses. Although this extension of case control methodology is virtually unexplored, it would seem to offer an economical means for "screening" a number of hypotheses concerning the association of the distribution of the characteristics of individuals (for example, their occupation) and the distribution of population mortality rates at the small area level. This may be particularly useful in screening for cancers associated with industrial exposure: the stratification variable can be a fixed attribute of local communities (e.g., the nature of its local industry); in the analysis, population characteristics as determined by the NHIS—reanalysis are controlling variables and mortality rates the outcome variable.

The recommendation of the TCP is, as one priority for research, that NCHS should explore the use of NHIS data in conjunction with other data sets such as statistics or service utilization data files (such as Health Care Financing Administration's Medical Provider Analysis and Review file) to improve the opportunity for etiologic and policy relevant case-control studies. It should also undertake a pilot demonstration project

^bIf, in fact, information can be shown to play a deciding role in the planning agency decisions, the cost effectiveness of the extension of the NHIS to small area data would be more apparent.

on the use of NHIS on a local small area basis under circumstances where planning agencies are: (1) faced with a decision on the investment of health resources in a particular community, (2) have utilization data which show resource and utilization rates between areas, and (3) agree to base their decision on the determination of differential need among populations. The hope is that the availability of policy relevant data will influence health policy decisions.

ANALYSIS AND TIMELINESS OF DISSEMINATION OF INFORMATION

It goes without saying that the value of the National Health Interview Survey is ultimately dependent on the extent to which it is used. The utility or "value" of information or knowledge, of course, is extremely difficult to quantify. However, it is self-evident that unanalyzed data are not useful, and the potential utility of data is dependent on the extent to which they are analyzed and utilized to answer interesting and important questions.

In 1972 the so-called Hauser Committee, established to evaluate the National Center for Health Statistics, cited timely dissemination of data and comprehensive data analysis as two areas that should be strengthened. In response to this review, the Center has strengthened its capabilities by establishing the Division of Analysis under the Associate Director for Analysis. In addition, *Advance Data Reports* were instituted for quicker dissemination of a limited amount of information; and a program of disseminating data tapes to users outside the Federal Government has been strengthened.

It is important to be cognizant of some of the realistic limitations on dissemination of NHIS data, particularly limitations with respect to time. The NHIS produces a massive data set each year. Therefore, a considerable amount of time between data collection and preparation of a clean data tape is inevitable. Currently, data tapes are made available to outsiders approximately 2 years after data collection, though tabulations can be made from the data tape much sooner than that. In addition, because of the sample size, there are some estimates that require more than 1 year's worth of data for reliability or in order to permit certain desirable cross tabulations. Although for certain limited purposes the NHIS can be a vehicle for the quick collection of data, historically that is not the way it has been conceived of, and administratively it has not been set up to provide quick data on a routine basis.

Currently, there are six ways in which data from the National Health Interview Survey are disseminated.

- Advance data reports, which provide rapid access to limited number of data. Some of these are available within 9 months after collection in the field has been completed.
- Series 10 reports, are comprehensive analytic presentations requiring considerable time to complete. The Current Estimates report is the first available, approximately 9 months following data collection. Other Series 10 reports may appear as late as 5 years following data collection.
- Data tapes are made available to users approximately 2 years following data collection.
- Special tabulations are prepared by requests for individual consumers. Responses are possible within a few weeks of the request and it requires 6 months after data collection to have core items and about twice that time for supplemental items.
- Special analytic reports are not included in the regular Series 10 publications. These include the methodological reports that have been invaluable in adding knowledge of survey design. They appear at irregular intervals on an *ad hoc* basis.
- Special analytic papers and articles prepared by individual NCHS staff members are presented at meetings or published in journals.

The strategies for serving users can be considered under three headings: providing raw data collected to Federal and non-Federal users, preparing quick reports of data, and preparing more extensive analytic reports of data collected.

Providing Raw Data and Tabulations

NCHS, as noted above, will provide data tapes to people who want NHIS data; and it will also prepare special tabulations upon request. Neither of these services is used to a great extent. Factors that may limit use include: (1) less than general familiarity with the mechanisms for obtaining NHIS data—whom to contact, the terms under which data would be available, costs, etc.; and (2) the relatively long lag time between data collection and the availability of data.

In addition, a key to the "lag" time is the shortage of analytic staff. NCHS does not want to release

tapes until some preliminary analyses have been carried out as a further check against serious coding or other tape errors. The recommendations regarding staff time that follow will help with the problem of providing timely raw data to users as well.

Quick Reports

The NHIS sample design permits quick, unbiased estimates of some items with as little as 2 weeks of interviewing. One key limit on the ability to use the NHIS to monitor, say, flu shots or the incidence of flu, is the lead time needed to develop and incorporate questions and the limited space that can be devoted to items. This problem could be alleviated if mechanisms were established to ease the incorporation of special purpose items in the NHIS. The desirability of that is discussed in Section V "Procedures for Adding Items to the NHIS."

In addition, the number and speed of quick reports is dependent on analytic staff time. This topic is addressed in more detail in the next section.

Ongoing Analysis

The most important concern of the TCP is the current level of NCHS-sponsored analysis of NHIS data. There were three related concerns that were noted:

- The ability to produce timely data was contingent on staff availability to carry out analyses.
- The value of the ongoing NHIS data collection effort is significantly affected by the limited analytic uses to which the data are put.
- In considering special-purpose data collection efforts (as contrasted with the ongoing core items) the utility of such special sections could only be considered in the context of how they would be used analytically. Thus the inclusion of a set of special items in the NHIS should be part of a total package that is designed and then analyzed in the context of an analysis plan. This requires a kind of continuity and integration of analytic and data collection efforts which currently does not exist in the NHIS setup.

NCHS staff members are aware of the problems noted above, but cite their inability to obtain authorization for increased numbers of staff positions in the

analytic area. In response the TCP makes the following four recommendations:

- Various recommendations have been made throughout this report about ways in which NHIS might be designed or strengthened. None of these recommendations is as important to increasing the contribution of the NHIS as strengthening the analytic capability of NCHS staff. In this light, highest priority should be given to increasing the number of analytic positions and, in addition, if feasible, the Center should also consider transferring positions from existing responsibilities to analytic responsibilities.
- NHIS should explore ways of offering incentives to staff members for producing and disseminating analyses of NHIS data.
- The IPA program also provides a mechanism whereby the analysis of NHIS data could be increased. The TCP strongly urges a concentrated effort by NCHS to recruit talented persons throughout the country to devote themselves to the analysis of NHIS data and the presentation of these analyses in well-disseminated publications.
- The TCP urges that details of the availability of NHIS data be more widely disseminated and that NCHS staff and resources be maintained at an adequate level to service requests for data in a timely fashion. When responding to requests for special data collections from other Federal agencies, part of the joint commitment should include staffing of the analysis itself. Such collaborative efforts may provide another opportunity to use the IPA approach to strengthen the analysis component of NCHS.

The TCP recognizes the value of various strategies to encourage the use of NHIS data through providing tabulations and data tapes to persons outside of the Federal Government. However, in the long run, it appears that most of the responsibility for analysis will have to emanate from and be coordinated by NCHS. In this light, the strengthening of the analysis staff and more closely integrating the analysis and data collection efforts are second to none in priority as ways to increase the value of the NHIS in its role as a major provider of health survey data in the Nation.

THE ROLE OF THE NATIONAL HEALTH INTERVIEW SURVEY IN MEETING SUBNATIONAL DATA NEEDS

Uses of Health Interviews at the State and Local Levels

The demand for State and local data.—The demand for data on health status and health services in individual States, counties, and cities has increased over the last 10 years because of Federal support for health planning and regulation at these levels. Support has been provided because of the increase in Federal health expenditures since the passage of Medicare and Medicaid, and because of the inflationary effect of increases in all health expenditures. The Congress has also expressed its concern that, despite large increases in spending, there is a maldistribution of health services at the State and local level.⁵

Under the National Health Planning and Resources Development Act of 1974 (Public Law 93-641), State Health Planning and Resource Development Agencies (SHPDA's) and sub-State Health Systems Agencies were created. They must prepare plans that propose actions to improve the health status of the people in their areas and access to needed health services, while controlling the rise in health expenditures. They are expected to review all major capital expenditures by health facilities to determine if a need exists and whether the project is an efficient use of health dollars. HSA's are also required to review and approve most Federal grants for health services.

Public Law 93-641 is not the only Federal program which requires State and local data. The Congress has required that support for the development of Health Maintenance Organizations, the placement of National Health Service Corps physicians, and the granting of scholarships and loans for physician service in shortage areas be based on need rather than local skill in preparing applications. Under the HMO Act of 1973 and the Health Professions Educational Assistance Act of 1976, the Department of Health, Education, and Welfare was required to designate underserved and shortage areas. The Index of Medical Underservice and Health Manpower Shortage Area criteria were developed in response, and areas of need as small as census tracts have been designated.

While it is now common to speak of the data needs of State and local planners, we should remember that funding for HSA's and SHPDA's comes from the Federal government, that Federal Health expenditures are rising at an unacceptable level, that national health insurance is being delayed because of the

magnitude of current cost increases, and that Congress has shown an increasing tendency to mandate Federal designation of small areas in need of health resources. There is, therefore, a substantial Federal need for data at the State and local level.

Unique characteristics of health interview data.—In order to insure that private and public expenditures for health care are distributed equitably, estimates of the total utilization of health services and the health status of the entire population are required. Information on only that part of the population that uses the medical care system regularly is insufficient. While the factors explaining differences in health status and utilization have been the focus of research for several decades, it is only now that major reallocations of funds in response to such information has become a possibility. Since resources such as hospitals, clinics, and physicians must be allocated to neighborhoods, cities, and counties rather than to States or regions as a whole, data are required at those levels.

It is now difficult to obtain information at the State and local level, even on those who use the medical care system. Only a few States require the submission of hospital billing or discharge data for analysis, and no State requires the submission of data from physicians on all patients, regardless of source of payment. The national Medicare program makes available only the number of hospital discharges, patient days, and total reimbursement at the county level. Total reimbursement by county is all that is available for medical care (Part B). The differences in reimbursement per enrollee for hospital care provide one indication that substantially more information is needed if planners and regulators are to make decisions that increase rather than decrease equity in the distribution of health care dollars. The following table illustrates some striking differences in Medicare reimbursement by geographic region.

Geographic region	1974 Medicare reimbursement per enrollee 65 years and over		1974 short-stay non-Federal hospital beds per 1,000 civilian population (excluding psychiatric)
	Parts A & B	Part A	
Northeast.....	\$544	401	4.56
South.....	395	287	4.26
New York.....	623	457	4.77
Arkansas.....	316	220	4.50

Source: National Center for Health Statistics: *Health, United States, 1976-77*, Tables X, 127, and 145.

Even when billing, hospital charge or outpatient visit data are available, health interview surveys can provide valuable supplemental information. Legal and cost considerations require that only a limited amount of data be captured as part of routine administrative procedures. Topics such as the use of multiple providers, health knowledge, and lifestyle can be pursued most effectively through population surveys.

While health interview surveys will have to change as our ability to capture information from medical care providers improves, there will always be need to provide information on all people, regardless of their use of the medical care system, and to help explain differences in health status and the use of services. Certain data necessary for health planning can only be obtained by survey methods such as those used by NHIS, and there will continue to be a need for continuous health interview surveys.

Possible uses of health interview data for State or local communities.—Since there are many ways in which interview data could be used at the State and local level, only two will be discussed here. They both concern the response to a Federal mandate to determine the supply of health care resources at the local level.

1. *National Guidelines for Health Planning: General Hospital Bed Supply.*—Public Law 93-641 required the Secretary of Health, Education, and Welfare to provide standards for the appropriate supply, distribution, and organization of health resources. In response, DHEW has published standards for a number of inpatient hospital services, including a standard for the number of hospital beds that should be available:

“121.201—General Hospitals—Bed Supply

(a) Standard. There should be less than four non-Federal, short-stay hospital beds for each 1,000 persons in a health service area except under extraordinary circumstances. For purposes of this section, short-stay hospital beds include all non-Federal short-stay hospital beds (including general and medical/surgical, children's, obstetric, psychiatric, and other short-stay specialized beds)”.⁶

A number of factors may be used to demonstrate that an adjustment is required to this basic standard.

- When more than 12 percent of the population is 65 years of age and over.

- Variations in demand caused by seasonal fluctuations.
- For persons living in rural areas there should be access within a reasonable period of time travel (e.g., 30 minutes).
- For persons living in urban areas there should be a greater ratio in some areas if entire SMSA meets standard.
- Consideration should be made for beds used by referred patients who reside outside both the SMSA and HSA.

State Health Plans and sub-State Health Systems Plans must conform to this standard if they are adopted after December 31, 1978. The application of this standard in some areas would halt construction and prevent some hospitals from renovating. Data from health interview surveys could make a number of contributions to assuring that the application of this standard results in an appropriate supply and distribution of resources. This information is not available from other sources.

- Factors related to above or below average use of services could be examined. High utilization and a higher ratio of beds to population could be justified by poor health related to occupation, income, or other factors. The need for a lower ratio may also be identified.
- The use of hospital services outside of the immediate community could be identified. A ratio of beds to actual service area population could then be calculated.

This type of information is essential, since the ratio of 4 to 1,000 is merely a benchmark against which the needs of each community are to be measured.

2. *Health manpower shortage areas.*—The Health Professions Educational Assistance Act of 1976 required that DHEW designate health manpower shortage areas across the United States. Designation as a shortage area brings a number of benefits, including eligibility to receive National Health Service Corps physicians, and a greater likelihood that some

physicians will locate in the area because a portion of their Federal education loans will be forgiven for service in a shortage area. The Senate report on this bill expressed dissatisfaction with criteria used in the past that focused on the physician-population ratio. Faced with a Congressional mandate to designate service areas across the country, DHEW applied a basic ratio of one primary care physician to 3,500 people to designate shortage areas. In a letter to the Nation's Health Systems Agencies and State Planning Agencies, DHEW urged that planning agencies examine any data they had that would suggest whether these or other areas in fact faced a shortage of primary care manpower.⁷ The criteria that a planning agency can use to substantiate that a geographic area with a ratio of between 3,500 and 3,000:1 is a shortage area are as follows:⁸

- Unusually high need for primary care, as measured by (any one) (1) high fertility rates, more than 200 births per 1,000 women aged 15-44 years, or 40 births per 1,000 women aged 13-17 years; (2) infant mortality is greater than 20 per 1,000; (3) more than 30 percent of population (or of households) below the poverty level.
- Insufficient capacity of existing primary care providers, as measured by (any two) (1) more than 8,000 visits per year per physician; (2) unusually long appointments waiting times—7 days for established patients and 14 days for new patients; (3) excessive average waiting time at providers' office—more than 1 hour if appointment and more than 2 hours if first come, first served; (4) excessive use of emergency room facilities for primary care; (5) two-thirds or more of area physicians do not accept new patients; (6) low utilization—2.0 or less visits per year.

While the first three criteria involve the use of readily available data, the validity of infant mortality and poverty status as indicators of medical underservice has been questioned by Kleinman and Wilson.⁹

Data on four of the six criteria concerning insufficient capacity would be obtained

through health interview surveys. These Federal criteria were developed because the supply of physicians is clearly inadequate as an indicator of unmet demand or need. Without improved access to information on consumers, planners are forced to rely on information concerning the production and efficiency of the providers of health care to make resource allocation decisions. In order to reduce inequities in the availability of health services, planners will need both information from providers and health interview data directly from all of the population served.

Summary of needs.—The Federal Government has increasingly become involved in the allocation of health care resources at the State and local level. Inasmuch as effective health planning must take place at the local level, National and State data alone are inadequate.

Major barriers to the collection of health interview data at the local level are the size and costs of such surveys. Other parts of this report examine the methodological options currently being explored for health interview surveys, but the financing of surveys remains a critical problem. We need to remember, however, how common it now is to survey a sample of voters every 2 to 4 years on a limited set of topics in order to provide information for political candidates. Many commercial companies use similar procedures in allocating their dollars for a new-product development. In allocating billions of tax dollars for health care we cannot afford to underfinance the cost of the collection of information required to evaluate and improve health services.

Capabilities of the National Sample

The present national sample.—The national sample in 1978 consists of a multistage highly stratified probability selection of approximately 40,000 households interviewed over 1 year. The stratification is by geographic location, population density, rate of population growth between 1960 and 1970, proportion of population other than white in each area, and type of industry. The design and interviewing follow a continuous structure so that each week's interviews constitute a probability sample of the population. Primary focus is on estimates for the Nation as a whole, based on 52 weeks of interviews. But some estimates are published on the basis of 13 sample weeks, some on 104, and occasionally on a single week for a high-incidence phenomenon. In addition to nationwide estimates, the National Center for

Health Statistics has released selected statistics for each of four geographic regions of the country, and for each of the eight largest metropolitan areas. Estimates are prepared for a considerable variety of health topics, many of them displayed separately for different demographic and socioeconomic categories of the population. The more global estimates of high-frequency events or conditions usually have low relative sampling errors of not more than a few percentage points; estimates of low-frequency phenomena or for smaller categories of the population have larger relative sampling errors, although NCHS policy requires that a published statistic that has more than a 30-percent sampling error be footnoted to indicate that the figure does not meet standards of reliability or precision.

The subnational problems.—As just noted, past practice has restricted publication of direct estimates from the national samples for subnational areas to four broad regions and eight large metropolitan areas. The present design is not well adapted to preparation of estimates for individual States, and cannot yield data for most counties or smaller areas at any reasonable level of precision. Some redesigning of the basic sample is normally undertaken after new data are received from each decennial population census. Following the 1980 census, it is expected that the primary sampling units will be redefined, stratification will be along State lines, and other design aspects will be updated.

The NCHS staff has estimated that with the contemplated changes just referred to, and no increase in sample size, it would be possible to produce annual estimates only for the eight largest States and metropolitan areas as indicated in the table that follows.

Number and minimum population of States and standard metropolitan statistical areas (SMSAs) for annual selected statistics could be published from a redesigned Health Interview Survey by sample size.

Geographic area	Sample size (households)		
	40,000 ¹	80,000	160,000
SMSAs			
Number.....	8	16	36
Size (in millions).....	2.5	1.5	0.9
States			
Number.....	8	16	28
Size (in millions) ²	8.0	4.5	2.5

¹Current HIS Sample Size.
²The sample size required to provide estimates for most States is approximately three times larger than the sample size needed to produce estimates of an SMSA. This difference is due to the additional component of variation between cities and places within States that is associated with State estimates.

The table also displays the estimates that would result from doubling or quadrupling the present sample size.¹⁰

This redesign and a possible increase in the sample size would represent a substantial improvement in the NHIS capacity to produce direct estimates for subnational areas. Not only would the number of areas be increased, but more items, more detail classification, and higher precision would be possible, particularly for the larger areas. Yet the problem would still be far from fully resolved. Even with a four-fold increase in sample size, publishable data would be unavailable for at least 22 States, many metropolitan areas, Health Systems Agencies, and nearly all counties and smaller areas.

The TCP believes that the effort to produce area-specific statistics for each small area through the NHIS is misguided. Such a course is far too expensive to be cost effective, and will not produce data that are comparable from area to area because of serious local measurement variations. In addition, many area-specific data may not in fact be used in any meaningful fashion. The better course is to consolidate national data into classes of areas, e.g., central cities in the Census Bureau's North Central U.S. Division with more than 4,000,000 population, more than 30-percent black population, and median income less than \$8,000. It is likely that data for such classes can be made more accurate than data for the individual component areas at the same or even lower costs.

Possible variations in use of national sample resources.— The above discussion is of the NHIS sample collected under present procedures and its capacity to produce subnational area estimates on the basis of 52 week's interviewing. A number of modifications of this procedure could be adopted, or explored, each of which would strengthen the subnational program, with little or no weakening of the national program.

The simplest modification would be to place the subnational publication schedule on a biennial timetable for all except the most global statistics. This would allow 104 weeks of interviews to be brought to bear and would reduce sampling errors of area statistics by approximately 30 percent. However, for health conditions which change from year to year, such as influenza, this modification would not be satisfactory. Similarly producing statistics for a metropolitan area with a population of less than 1.5 million would still not be possible under this modification.

A considerable number of possible different allocations of interviews among States would yield publishable data for more items for more States and

Standard Metropolitan Statistical Areas, with some increase in unit costs and modest decreases in the precision of national estimates. These allocations would close some but by no means all the gaps in subnational data.

A more radical change in national sample procedure would be along the following lines. The sample resources would be divided into two parts: Part A would consist of present procedures, would provide most of the national estimates, and would yield the more needed global statistics for larger subnational areas. Part B would distribute the remaining resources more widely geographically than at present. This would be made possible by reducing the number of topics covered in Part B and by using lower-cost collection techniques, mainly mail and telephone. The topics covered by Part B would be those most specifically needed by local areas and found to be collectable with adequate quality by mail or telephone. A sample of 1,000 households would produce reliable estimates (estimates with a relative standard error of less than 30 percent) for conditions with a frequency of more than 370 per 100,000 population. Evaluation of the mail and telephone procedures could be maintained by interpenetration by area of portions of Part B with Part A.

The contribution of between-interviewer variation to total error of the estimates is one of the factors that places certain restrictions on the number of areas for which direct estimates with tolerable sampling error can be prepared from the NHIS sample. Estimates for any given area have a component of variance that varies inversely with the number of interviewers in the area, assuming that the interviewers have the same general ability and training. This means that, for a given budget, the risk of unacceptable interviewer impact on estimates increases with an increase in the number of areas covered. The Committee considered suggesting the rotation of communities (PSU's) in and out of the sample, thereby increasing the total number of areas covered over a period of several years. This idea was dropped, in part because it likely would entail either a decrease in the ratio of interviewers to areas, or the use of less thoroughly trained interviewers. Rotating a supplementary sample around the country over a 5 to 10 year period was also questioned from the point of view of still not being able to address specific health issues in local areas on a timely basis.

Some or all of these strategies offer promise for strengthening the reliability and usefulness of data from the NHIS. However, none of them offer the possibility of meeting subnational issues.

Synthetic and composite estimates.— The demand

for small-area data has been increasing rapidly in many areas besides health; e.g., unemployment, income, and housing. Direct collection of information in sample surveys at this level is prohibitively expensive, and statisticians in recent years have developed some promising alternative techniques for the estimation of small-area data. Most of these techniques make use of relationships or associations between the variables to be estimated and other variables for which small-area data are already available from some source, such as a population census.

One of the earliest techniques used is called "synthetic estimation." This technique is based on an assumption that the rates (e.g., of morbidity) observed for population subgroups at the national level also apply to those same population subgroups in each political subdivision. If the distribution of the population subgroups (typically, although not necessarily defined by age, sex, and race) is known for each subdivision, the overall rate for that subdivision can then be estimated.

NCHS has used adaptations of the synthetic estimate in research, and to release estimates of disability by State. In 1972 the Hauser Committee, in its broad evaluation of NCHS programs, concluded: "...the rationale behind the (synthetic) model is plausible... results... suggest that these State figures do have merit, even though they are but provisional approximations. Lacking superior evidence, they should be useful."

More recently, a good bit of research has been done on the subject, by NCHS and others. Literature on the topic is developing. A number of investigators believe that the most promising single approach to the subnational area problem is the utilization of an estimator of which the synthetic estimate is one component. This preferred estimator, which is often called the composite estimator, is usually a weighted mean of a synthetic estimate and a direct sample estimate of an item for the same area. The composite estimator makes it possible to utilize all direct data from the national sample and to augment those data with the "plausible" evidence constructed from the synthetic model. The estimator has real promise, especially for those areas for which a direct estimate from NHIS has a sampling error that is unacceptably large for budgets likely to be available. Any increase in the size of the national sample strengthens both components of the composite estimator.

Synthetic estimating procedures may provide a way of using NHIS data to meet some local data needs in the future. Thus far, however, the value of such procedures has not been well demonstrated, although new techniques are being examined. In

particular, combining synthetic estimates from the NHIS with direct estimates from small local surveys may be a promising approach. Further research is needed on such strategies.

Recommendations to Meet Subnational Data Needs

There has been a growing demand for more detailed data from the National Health Interview Survey and particularly in a form so that the results can be disaggregated by region, State, Standard Metropolitan Statistical Area (SMSA) and Health Systems Agency (HSA). The contents of Section V. of this report provide examples of how health planning at all levels can be improved by the availability of interview data for local areas. Although a strengthening of the survey, as discussed in Section V. will increase its capacity toward this end, the regular collection and publication for all these subnational areas is an expensive operation and would require an inordinate increase in sample size.

Meeting the needs for the kinds of subnational data outlined in Section V. by increasing the sample size of the NHIS would require an increase so large that the expenditure would not be an efficient use of national resources. A more suitable and practical method is for the National Center for Health Statistics to provide a complete range of technical assistance and demonstration activities on health interview survey methods and the uses of health interview survey data to those agencies and organizations that are in need of such assistance on specific questions and at varying times.

In developing this program of technical assistance, full consideration should be given to the use of relatively low-cost data collection methods, such as mail, telephone, and diary techniques when and where they can be expected to produce data of adequate validity and reliability to meet local requirements. In addition, the NCHS staff should conduct research and should keep abreast of new research by others in the theory and application of small-area estimation techniques. The program for publication of small-area estimates should be expanded and State and local users should be assisted in applying these techniques, where appropriate, to meet their specific requirements.

It is recommended that NCHS, in accord with new enabling legislation in Section 306(i), Public Law 95-623, develop a program of technical assistance and establish criteria of funding, staffing, and survey design to guide these subnational groups in formulating their plans to collect, use, and evaluate health interview survey data. Contractual support and the use of IPA personnel for providing technical assistance may be used as deemed desirable by NCHS but the primary source of service should be rendered by the professional staff of NCHS whose number and resources may need to be increased for this specific purpose.

It is further recommended that the annual budget for this activity be in an amount appropriate to meet the needs starting with fiscal year 1980. Capability to provide technical assistance to agencies and organizations in need of such advice may require a substantial increase in the budget of the National Center for Health Statistics.

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